

Semester – 5			
Course Code	Course Type	Course Title	Credits
USIT501	Skill Enhancement Course	Software Project Management	2
USIT502	Skill Enhancement Course	Internet of Things	2
USIT503	Skill Enhancement Course	Advanced Web Programming	2
USIT504	Discipline Specific Elective (Any One)	Artificial Intelligence	2
USIT505		Linux System Administration	
USIT506	Discipline Specific Elective (Any One)	Enterprise Java	2
USIT507		Next Generation Technologies	
USIT5P1	Skill Enhancement Course Practical	Project Dissertation	2
USIT5P2	Skill Enhancement Course Practical	Internet of Things Practical	2
USIT5P3	Skill Enhancement Course Practical	Advanced Web Programming Practical	2
USIT5P4	Discipline Specific Elective Practical (Any One)*	Artificial Intelligence Practical	2
USIT5P5		Linux Administration Practical	
USIT5P6	Discipline Specific Elective Practical (Any One)*	Enterprise Java Practical	2
USIT5P7		Next Generation Technologies Practical	
<b>Total Credits</b>			<b>20</b>

*(All the practical mentioned in the syllabi are compulsory as per the courses chosen)*

Semester – 6			
Course Code	Course Type	Course Title	Credits
USIT601	Skill Enhancement Course	Software Quality Assurance	2
USIT602	Skill Enhancement Course	Security in Computing	2
USIT603	Skill Enhancement Course	Business Intelligence	2
USIT604	Discipline Specific Elective (Any One)	Principles of Geographic Information Systems	2
USIT605		Enterprise Networking	
USIT606	Discipline Specific Elective (Any One)	IT Service Management	2
USIT607		Cyber Laws	
USIT6P1	Skill Enhancement Course Practical	Project Implementation	2
USIT6P2	Skill Enhancement Course Practical	Security in Computing Practical	2
USIT6P3	Skill Enhancement Course Practical	Business Intelligence Practical	2
USIT6P4	Discipline Specific Elective Practical (Any One)*	Principles of Geographic Information Systems Practical	2
USIT6P5		Enterprise Networking Practical	
USIT6P6	Skill Enhancement Course Practical	Advanced Mobile Programming	2
<b>Total Credits</b>			<b>20</b>

\*The choice of Practical course is based on the theory Course. For Semester V, USIT504, USIT505, USIT506 and USIT507, the practical courses are USIT5P4, USIT5P5 USIT5P6, USIT5P7. For Semester VI, USIT604, USIT605 the practical courses are USIT6P4, USIT6P5 respectively. Practical Course USIT6P6 is compulsory.

<b>B. Sc. (Information Technology)</b>	<b>Semester – VI</b>	
<b>Course Name: Software Quality Assurance</b>		<b>Course Code: USIT601</b>
<b>Periods per week (1 Period is 50 minutes)</b>		<b>5</b>
<b>Credits</b>		<b>2</b>
	<b>Hours</b>	<b>Marks</b>
<b>Evaluation System</b>	<b>Theory Examination</b>	<b>75</b>
	<b>Internal</b>	<b>25</b>

<b>Unit</b>	<b>Details</b>	<b>Lectures</b>
<b>I</b>	<p><b>Introduction to Quality:</b> Historical Perspective of Quality, What is Quality? (Is it a fact or perception?), Definitions of Quality, Core Components of Quality, Quality View, Financial Aspect of Quality, Customers, Suppliers and Processes, Total Quality Management (TQM), Quality Principles of Total Quality Management, Quality Management Through Statistical Process Control, Quality Management Through Cultural Changes, Continual (Continuous) Improvement Cycle, Quality in Different Areas, Benchmarking and Metrics, Problem Solving Techniques, Problem Solving Software Tools.</p> <p><b>Software Quality:</b> Introduction, Constraints of Software Product Quality Assessment, Customer is a King, Quality and Productivity Relationship, Requirements of a Product, Organisation Culture, Characteristics of Software, Software Development Process, Types of Products, Schemes of Criticality Definitions, Problematic Areas of Software Development Life Cycle, Software Quality Management, Why Software Has Defects? Processes Related to Software Quality, Quality Management System Structure, Pillars of Quality Management System, Important Aspects of Quality Management.</p>	12
<b>II</b>	<p><b>Fundamentals of testing:</b> Introduction, Necessity of testing, What is testing? Fundamental test process, The psychology of testing, Historical Perspective of Testing, Definitions of Testing, Approaches to Testing, Testing During Development Life Cycle, Requirement Traceability Matrix, Essentials of Software Testing, Workbench, Important Features of Testing Process, Misconceptions About Testing,</p>	12

	Principles of Software Testing, Salient Features of Good Testing, Test Policy, Test Strategy or Test Approach, Test Planning, Testing Process and Number of Defects Found in Testing, Test Team Efficiency, Mutation Testing, Challenges in Testing, Test Team Approach, Process Problems Faced by Testing, Cost Aspect of Testing, Establishing Testing Policy, Methods, Structured Approach to Testing, Categories of Defect, Defect, Error, or Mistake in Software, Developing Test Strategy, Developing Testing Methodologies (Test Plan), Testing Process, Attitude Towards Testing (Common People Issues), Test Methodologies/Approaches, People Challenges in Software Testing, Raising Management Awareness for Testing, Skills Required by Tester, Testing throughout the software life cycle, Software development models, Test levels, Test types, the targets of testing, Maintenance testing	
III	<b>Unit Testing:</b> Boundary Value Testing: Normal Boundary Value Testing, Robust Boundary Value Testing, Worst-Case Boundary Value Testing, Special Value Testing, Examples, Random Testing, Guidelines for Boundary Value Testing, <b>Equivalence Class Testing:</b> Equivalence Classes, Traditional Equivalence Class Testing, Improved Equivalence Class Testing, Edge Testing, Guidelines and Observations. <b>Decision Table-Based Testing:</b> Decision Tables, Decision Table Techniques, Cause-and-Effect Graphing, Guidelines and Observations, <b>Path Testing:</b> Program Graphs, DD-Paths, Test Coverage Metrics, Basis Path Testing, Guidelines and Observations, <b>Data Flow Testing:</b> Define/Use Testing, Slice-Based Testing, Program Slicing Tools.	12
IV	<b>Software Verification and Validation:</b> Introduction, Verification, Verification Workbench, Methods of Verification, Types of reviews on the basis of Stage Phase, Entities involved in verification, Reviews in testing lifecycle, Coverage in Verification, Concerns of Verification, Validation, Validation Workbench, Levels of Validation, Coverage in Validation, Acceptance Testing, Management of Verification and Validation, Software development verification and validation activities. <b>V-test Model:</b> Introduction, V-model for software, testing during Proposal stage, Testing during requirement stage, Testing during test planning phase, Testing during design phase, Testing during coding, VV Model, Critical Roles and Responsibilities.	12
V	<b>Levels of Testing:</b> Introduction, Proposal Testing, Requirement Testing, Design Testing, Code Review, Unit Testing, Module Testing, Integration Testing, Big-Bang Testing, Sandwich Testing, Critical Path First, Sub System Testing, System Testing, Testing Stages. <b>Special Tests:</b> Introduction, GUI testing, Compatibility Testing, Security Testing, Performance Testing, Volume Testing, Stress Testing, Recovery Testing, Installation Testing, Requirement Testing, Regression Testing, Error Handling Testing, Manual Support Testing,	12

	Intersystem Testing, Control Testing, Smoke Testing, Adhoc Testing, Parallel Testing, Execution Testing, Operations Testing, Compliance Testing, Usability Testing, Decision Table Testing, Documentation Testing, Training testing, Rapid Testing, Control flow graph, Generating tests on the basis of Combinatorial Designs, State Graph, Risk Associated with New Technologies, Process maturity level of Technology, Testing Adequacy of Control in New technology usage, Object Oriented Application Testing, Testing of Internal Controls, COTS Testing, Client Server Testing, Web Application Testing, Mobile Application Testing, eBusiness eCommerce Testing, Agile Development Testing, Data Warehousing Testing.	
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<b>Books and References:</b>					
<b>Sr. No.</b>	<b>Title</b>	<b>Author/s</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year</b>
1.	Software Testing and Continuous Quality Improvement	William E. Lewis	CRC Press	Third	2016
2	Software Testing: Principles, Techniques and Tools	M. G. Limaye	TMH		2017
3.	Foundations of Software Testing	Dorothy Graham, Erik van Veenendaal, Isabel Evans, Rex Black	Cengage Learning	3 <sup>rd</sup>	
4.	Software Testing: A Craftsman's Approach	Paul C. Jorgenson	CRC Press	4 <sup>th</sup>	2017

<b>B. Sc. (Information Technology)</b>	<b>Semester – VI</b>	
<b>Course Name: Security in Computing</b>	<b>Course Code: USIT602</b>	
<b>Periods per week (1 Period is 50 minutes)</b>	<b>5</b>	
<b>Credits</b>	<b>2</b>	
	<b>Hours</b>	<b>Marks</b>
<b>Evaluation System</b>	<b>Theory Examination</b>	<b>75</b>
	<b>Internal</b>	<b>25</b>

<b>Unit</b>	<b>Details</b>	<b>Lectures</b>
<b>I</b>	<p><b>Information Security Overview:</b> The Importance of Information Protection, The Evolution of Information Security, Justifying Security Investment, Security Methodology, How to Build a Security Program, The Impossible Job, The Weakest Link, Strategy and Tactics, Business Processes vs. Technical Controls.</p> <p><b>Risk Analysis:</b> Threat Definition, Types of Attacks, Risk Analysis.</p> <p><b>Secure Design Principles:</b> The CIA Triad and Other Models, Defense Models, Zones of Trust, Best Practices for Network Defense.</p>	12
<b>II</b>	<p><b>Authentication and Authorization:</b> Authentication, Authorization</p> <p><b>Encryption:</b> A Brief History of Encryption, Symmetric-Key Cryptography, Public Key Cryptography, Public Key Infrastructure.</p> <p><b>Storage Security:</b> Storage Security Evolution, Modern Storage Security, Risk Remediation, Best Practices.</p> <p><b>Database Security:</b> General Database Security Concepts, Understanding Database Security Layers, Understanding Database-Level Security, Using Application Security, Database Backup and Recovery, Keeping Your Servers Up to Date, Database Auditing and Monitoring.</p>	12
<b>III</b>	<p><b>Secure Network Design:</b> Introduction to Secure Network Design, Performance, Availability, Security.</p> <p><b>Network Device Security:</b> Switch and Router Basics, Network Hardening.</p> <p><b>Firewalls:</b> Overview, The Evolution of Firewalls, Core Firewall</p>	12

	Functions, Additional Firewall Capabilities, Firewall Design. <b>Wireless Network Security:</b> Radio Frequency Security Basics, Data-Link Layer Wireless Security Features, Flaws, and Threats, Wireless Vulnerabilities and Mitigations, Wireless Network Hardening Practices and Recommendations, Wireless Intrusion Detection and Prevention, Wireless Network Positioning and Secure Gateways.	
IV	<b>Intrusion Detection and Prevention Systems:</b> IDS Concepts, IDS Types and Detection Models, IDS Features, IDS Deployment Considerations, Security Information and Event Management (SIEM). <b>Voice over IP (VoIP) and PBX Security:</b> Background, VoIP Components, VoIP Vulnerabilities and Countermeasures, PBX, TEM: Telecom Expense Management. <b>Operating System Security Models:</b> Operating System Models, Classic Security Models, Reference Monitor, Trustworthy Computing, International Standards for Operating System Security.	12
V	<b>Virtual Machines and Cloud Computing:</b> Virtual Machines, Cloud Computing. <b>Secure Application Design:</b> Secure Development Lifecycle, Application Security Practices, Web Application Security, Client Application Security, Remote Administration Security. <b>Physical Security:</b> Classification of Assets, Physical Vulnerability Assessment, Choosing Site Location for Security, Securing Assets: Locks and Entry Controls, Physical Intrusion Detection.	12

<b>Books and References:</b>					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	TheCompleteReference: Information Security	Mark Rhodes-Ousley	McGraw-Hill	2 <sup>nd</sup>	2013
2.	Essential Cybersecurity Science	Josiah Dykstra	O'Reilly	Fifth	2017
3.	Principles of Computer Security: CompTIA Security+ and Beyond	Wm.Arthur Conklin, Greg White	McGraw Hill	Second	2010

<b>B. Sc. (Information Technology)</b>	<b>Semester – VI</b>	
<b>Course Name: Business Intelligence</b>	<b>Course Code: USIT603</b>	
<b>Periods per week (1 Period is 50 minutes)</b>	<b>5</b>	
<b>Credits</b>	<b>2</b>	
	<b>Hours</b>	<b>Marks</b>
<b>Evaluation System</b>	<b>Theory Examination</b>	<b>2½</b>
	<b>Internal</b>	<b>--</b>
		<b>75</b>
		<b>25</b>

<b>Unit</b>	<b>Details</b>	<b>Lectures</b>
<b>I</b>	<b>Business intelligence:</b> Effective and timely decisions, Data, information and knowledge, The role of mathematical models, Business intelligence architectures, Ethics and business intelligence <b>Decision support systems:</b> Definition of system, Representation of the decision-making process, Evolution of information systems, Definition of decision support system, Development of a decision support system	<b>12</b>
<b>II</b>	<b>Mathematical models for decision making:</b> Structure of mathematical models, Development of a model, Classes of models <b>Data mining:</b> Definition of data mining, Representation of input data , Data mining process, Analysis methodologies <b>Data preparation:</b> Data validation, Data transformation, Data reduction	<b>12</b>
<b>III</b>	<b>Classification:</b> Classification problems, Evaluation of classification models, Bayesian methods, Logistic regression, Neural networks, Support vector machines <b>Clustering:</b> Clustering methods, Partition methods, Hierarchical methods, Evaluation of clustering models	<b>12</b>
<b>IV</b>	<b>Business intelligence applications:</b> <b>Marketing models:</b> Relational marketing, Sales force management, <b>Logistic and production models:</b> Supply chain optimization, Optimization models for logistics planning, Revenue management systems.	<b>12</b>

	<b>Data envelopment analysis:</b> Efficiency measures, Efficient frontier, The CCR model, Identification of good operating practices	
V	<p><b>Knowledge Management:</b> Introduction to Knowledge Management, Organizational Learning and Transformation, Knowledge Management Activities, Approaches to Knowledge Management, Information Technology (IT) In Knowledge Management, Knowledge Management Systems Implementation, Roles of People in Knowledge Management</p> <p><b>Artificial Intelligence and Expert Systems:</b> Concepts and Definitions of Artificial Intelligence, Artificial Intelligence Versus Natural Intelligence, Basic Concepts of Expert Systems, Applications of Expert Systems, Structure of Expert Systems, Knowledge Engineering, Development of Expert Systems</p>	12

<b>Books and References:</b>					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Business Intelligence: Data Mining and Optimization for Decision Making	Carlo Vercellis	Wiley	First	2009
2.	Decision support and Business Intelligence Systems	Efraim Turban, Ramesh Sharda, DursunDelen	Pearson	Ninth	2011
3.	Fundamental of Business Intelligence	Grossmann W, Rinderle-Ma	Springer	First	2015

<b>B. Sc. (Information Technology)</b>	<b>Semester – VI</b>	
Course Name: Principles of Geographic Information Systems	Course Code: USIT604 <b>(Elective I)</b>	
Periods per week (1 Period is 50 minutes)	<b>5</b>	
Credits	<b>2</b>	
	<b>Hours</b>	<b>Marks</b>
Evaluation System	<b>Theory Examination</b>	<b>2½</b>
	<b>Internal</b>	<b>--</b>
		<b>25</b>

<b>Unit</b>	<b>Details</b>	<b>Lectures</b>
<b>I</b>	<p><b>A Gentle Introduction to GIS</b></p> <p><b>The nature of GIS:</b> Some fundamental observations, Defining GIS, GISystems, GIScience and GIAplications, Spatial data and Geoinformation.</p> <p><b>The real world and representations of it:</b> Models and modelling, Maps, Databases, Spatial databases and spatial analysis</p> <p><b>Geographic Information and Spatial Database</b></p> <p><b>Models and Representations of the real world</b></p> <p><b>Geographic Phenomena:</b> Defining geographic phenomena, types of geographic phenomena, Geographic fields, Geographic objects, Boundaries</p> <p><b>Computer Representations of Geographic Information:</b> Regular tessellations, irregular tessellations, Vector representations, Topology and Spatial relationships, Scale and Resolution, Representation of Geographic fields, Representation of Geographic objects</p> <p><b>Organizing and Managing Spatial Data</b></p> <p><b>The Temporal Dimension</b></p>	<b>12</b>
<b>II</b>	<p><b>Data Management and Processing Systems</b></p> <p><b>Hardware and Software Trends</b></p> <p><b>Geographic Information Systems:</b> GIS Software, GIS Architecture</p>	<b>12</b>

	<p>and functionality, Spatial Data Infrastructure (SDI)</p> <p><b>Stages of Spatial Data handling:</b> Spatial data handling and preparation, Spatial Data Storage and maintenance, Spatial Query and Analysis, Spatial Data Presentation.</p> <p><b>Database management Systems:</b> Reasons for using a DBMS, Alternatives for data management, The relational data model, Querying the relational database.</p> <p><b>GIS and Spatial Databases:</b> Linking GIS and DBMS, Spatial database functionality.</p>	
III	<p><b>Spatial Referencing and Positioning</b></p> <p><b>Spatial Referencing:</b> Reference surfaces for mapping, Coordinate Systems, Map Projections, Coordinate Transformations</p> <p><b>Satellite-based Positioning:</b> Absolute positioning, Errors in absolute positioning, Relative positioning, Network positioning, code versus phase measurements, Positioning technology</p> <p><b>Data Entry and Preparation</b></p> <p><b>Spatial Data Input:</b> Direct spatial data capture, Indirect spatial data capture, Obtaining spatial data elsewhere</p> <p><b>Data Quality:</b> Accuracy and Positioning, Positional accuracy, Attribute accuracy, temporal accuracy, Lineage, Completeness, Logical consistency</p> <p><b>Data Preparation:</b> Data checks and repairs, Combining data from multiple sources</p> <p><b>Point Data Transformation:</b> Interpolating discrete data, Interpolating continuous data</p>	12
IV	<p><b>Spatial Data Analysis</b></p> <p><b>Classification of analytical GIS Capabilities</b></p> <p><b>Retrieval, classification and measurement:</b> Measurement, Spatial selection queries, Classification</p> <p><b>Overlay functions:</b> Vector overlay operators, Raster overlay operators</p> <p><b>Neighbourhood functions:</b> Proximity computations, Computation of diffusion, Flow computation, Raster based surface analysis</p> <p><b>Analysis:</b> Network analysis, interpolation, terrain modeling</p> <p><b>GIS and Application models:</b> GPS, Open GIS Standards, GIS Applications and Advances</p> <p><b>Error Propagation in spatial data processing:</b> How Errors propagate, Quantifying error propagation</p>	12
V	<p><b>Data Visualization</b></p> <p><b>GIS and Maps, The Visualization Process</b></p> <p><b>Visualization Strategies: Present or explore?</b></p> <p><b>The cartographic toolbox:</b> What kind of data do I have? How can I map my data?</p> <p><b>How to map?</b> How to map qualitative data, How to map quantitative data, How to map the terrain elevation, How to map time series</p>	12

	<b>Map Cosmetics, Map Dissemination</b>	
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<b>Books and References:</b>					
<b>Sr. No.</b>	<b>Title</b>	<b>Author/s</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year</b>
1.	Principles of Geographic Information Systems- An Introductory Text Book	Editors: Otto Huisman and Rolf A.	The International Institute of Geoinformation Science and Earth Observation	Fourth	2009
2.	Principles of Geographic Information Systems	P.A Burrough and R.A.McDonnell	Oxford University Press	Third	1999
3.	Fundamentals of Spatial Information Systems,	R.Laurini and D. Thompson,	Academic Press		1994
4.	Fundamentals of Geographic Information Systems	Michael N.Demers	Wiley Publications	Fourth	2009
5.	Introduction to Geographic Information Systems	Chang Kang-tsung (Karl),	McGrawHill	Any above 3 <sup>rd</sup> Edition	2013 7 <sup>th</sup> Edition
6.	GIS Fundamentals: A First Text on Geographic Information Systems	Paul Botsatd	XanEdu Publishing Inc	5 <sup>th</sup> Edition	

	SNMPv1    SNMPv2    SNMPv3,    Other    Network    Management Technologies    RMON,    RMON2    NetFlow    Compared    to    RMON    and SNMP,    CDP    LLDP    Syslog	
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<b>Books and References:</b>					
<b>Sr. No.</b>	<b>Title</b>	<b>Author/s</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year</b>
1.	CCDA200-310Official Cert Guide	ANTHONY BRUNO, CCIE No. 2738 STEVE JORDAN, CCIE No. 11293	Cisco Press		
2.	Network Warrior	Gary A Donabue	O Reilly	2 <sup>nd</sup>	2011

<b>B. Sc. (Information Technology)</b>	<b>Semester – VI</b>	
<b>Course Name: IT Services Management</b>		<b>Course Code: USIT606 (Elective I)</b>
<b>Periods per week (1 Period is 50 minutes),</b>		<b>5</b>
<b>Credits</b>		<b>2</b>
	<b>Hours</b>	<b>Marks</b>
<b>Evaluation System</b>	<b>Theory Examination</b>	<b>75</b>
	<b>Internal</b>	<b>25</b>

<b>Unit</b>	<b>Details</b>	<b>Lectures</b>
<b>I</b>	<b>IT Service Management:</b> Introduction, What is service management? What are services? Business Process, Principles of Service management: Specialisation and Coordination, The agency principle, Encapsulation, Principles of systems, The service Life Cycle, Functions and processes across the life cycle. <b>Service Strategy Principles:</b> Value creation, Service Assets, Service Provider Service Structures, Service Strategy Principles. <b>Service Strategy:</b> Define the market, Develop the offerings, Develop Strategic Assets, Prepare for execution. <b>Challenges, Critical Success factors and risks:</b> Complexity, Coordination and Control, Preserving value, Effectiveness in measurement, Risks.	12
<b>II</b>	<b>Service Design:</b> Fundamentals, <b>Service Design Principles:</b> Goals, Balanced Design, Identifying Service requirements, identifying and documenting business requirements and drivers, Design activities, Design aspects, Subsequent design activities, Design constraints, Service oriented architecture, Business Service Management, Service Design Models <b>Service Design Processes:</b> Service Catalogue Management, Service Level Management, Capacity Management, Availability Management, IT Service Continuity Management, Information Security	12

	Management, Supplier Management <b>Challenges, Critical Success factors and risks:</b> Challenges, Risks	
III	<p><b>Service Transition:</b> Fundamentals, <b>Service Transition Principles:</b> Principles Supporting Service Transition, Policies for Service Transition</p> <p><b>Service Transition Processes:</b> Transition planning and support, Change Management, Service Asses Configuration Management, Service and Deployment Management, Service Validation and Testing, Evaluation, Knowledge Management.</p> <p><b>Challenges, Critical Success factors and risks:</b>Challenges, Critical Success factors, Risks, Service Transition under difficult Conditions.</p>	12
IV	<p><b>Service Operation:</b> Fundamentals, <b>Service Operation Principles:</b> Functions, groups, teams, departments and divisions, a chieving balance in service operations, Providing service, Operation staff involvement in service design and service transition, Operational Health, Communication, Documentation</p> <p><b>Service Operation Processes:</b>Event Management, Incident Management, Request fulfilment, Problem Management, Access Management, Operational activities of processes covered in other lifecycle phases.</p> <p><b>Challenges, Critical Success factors and risks:</b>Challenges, Critical Success factors, Risks</p>	12
V	<p><b>Continual Service Improvement(CSI) Principles:</b> CSI Approach, CSI and organizational change, Ownership, CSI register, External and Internal drivers, Service level management, Knowledge management, The Deming cycle, Service Measurement, IT governance, Frameworks, models, standards and quality Systems, CSI inputs and outputs.</p> <p><b>CSI Process:</b> The seven-step improvement process. <b>CSI Methods nad Techniques:</b> Methods and techniques, Assessments, benchmarking, Service Measurement, Metrics, Return on Investment, Service reporting, CSI and other service management processes,</p> <p><b>Organising for CSI:</b>Organisational development, Functions, roles, Customer Engagement, Responsibility model - RACI, Competence and training.</p> <p><b>Technology considerations:</b> Tools to support CSI activities.</p> <p><b>Implementing CSI:</b>Critical Considerations for implementing CSI,The start, Governance, CSI and organisational change, Communication Strategy and Plan</p>	12

Books and References:						
Sr. No.	Title	Author/s	Publisher	Edition	Year	
1.	ITIL v3 Foundation Complete Certification Kit				2009	
2.	ITIL v3 Service Strategy		OGC/TSO			

<b>B. Sc. (Information Technology)</b>	<b>Semester – VI</b>	
Course Name: Security in Computing Practical	Course Code: USIT6P2	
Periods per week (1 Period is 50 minutes)	3	
Credits	2	
	Hours	Marks
Evaluation System	Practical Examination	2½
	Internal	--
		-

Practical No	Details
1	<b>Configure Routers</b>
a	OSPF MD5 authentication.
b	NTP.
c	to log messages to the syslog server.
d	to support SSH connections.
2	<b>Configure AAA Authentication</b>
a	Configure a local user account on Router and configure authenticate on the console and vty lines using local AAA
b	Verify local AAA authentication from the Router console and the PC-A client
3	<b>Configuring Extended ACLs</b>
a	<b>Configure, Apply and Verify an Extended Numbered ACL</b>
4	<b>Configure IP ACLs to Mitigate Attacks and IPV6 ACLs</b>

<b>a</b>	Verify connectivity among devices before firewall configuration.
<b>b</b>	Use ACLs to ensure remote access to the routers is available only from management station PC-C.
<b>c</b>	Configure ACLs on to mitigate attacks.
<b>d</b>	Configuring IPv6 ACLs
<b>5</b>	<b>Configuring a Zone-Based Policy Firewall</b>
<b>6</b>	Configure IOS Intrusion Prevention System (IPS) Using the CLI
<b>a</b>	Enable IOS IPS.
<b>b</b>	Modify an IPS signature.
<b>7</b>	<b>Layer 2 Security</b>
<b>a</b>	Assign the Central switch as the root bridge.
<b>b</b>	Secure spanning-tree parameters to prevent STP manipulation attacks.
<b>c</b>	Enable port security to prevent CAM table overflow attacks.
<b>8</b>	<b>Layer 2 VLAN Security</b>
<b>9</b>	<b>Configure and Verify a Site-to-Site IPsec VPN Using CLI</b>
<b>10</b>	<b>Configuring ASA Basic Settings and Firewall Using CLI</b>
<b>a</b>	Configure basic ASA settings and interface security levels using CLI
<b>b</b>	Configure routing, address translation, and inspection policy using CLI
<b>c</b>	Configure DHCP, AAA, and SSH
<b>d</b>	Configure a DMZ, Static NAT, and ACLs

<b>B. Sc. (Information Technology)</b>	<b>Semester – VI</b>	
<b>Course Name: Business Intelligence Practical</b>	<b>Course Code: USIT6P3</b>	
<b>Periods per week (1 Period is 50 minutes)</b>	<b>3</b>	
<b>Credits</b>	<b>2</b>	
	<b>Hours</b>	<b>Marks</b>
<b>Evaluation System</b>	<b>Practical Examination</b>	<b>2½</b>
	<b>Internal</b>	<b>--</b>
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<b>Practical No</b>	<b>Details</b>
<b>1</b>	Import the legacy data from different sources such as ( Excel , SqlServer, Oracle etc.) and load in the target system. ( You can download sample database such as Adventureworks, Northwind, foodmart etc.)
<b>2</b>	Perform the Extraction Transformation and Loading (ETL) process to construct the database in the Sqlserver.
<b>3</b>	a. Create the Data staging area for the selected database. b. Create the cube with suitable dimension and fact tables based on ROLAP, MOLAP and HOLAP model.
<b>4</b>	a.Create the ETL map and setup the schedule for execution. b. Execute the MDX queries to extract the data from the datawarehouse.
<b>5</b>	a. Import the datawarehouse data in Microsoft Excel and create the Pivot table and Pivot Chart.

	b. Import the cube in Microsoft Excel and create the Pivot table and Pivot Chart to perform data analysis.
<b>6</b>	Apply the what – if Analysis for data visualization. Design and generate necessary reports based on the datawarehouse data.
<b>7</b>	Perform the data classification using classification algorithm.
<b>8</b>	Perform the data clustering using clustering algorithm.
<b>9</b>	Perform the Linear regression on the given datawarehouse data.
<b>10</b>	Perform the logistic regression on the given datawarehouse data.

The BI tools such as Tableau / Power BI / BIRT / R / Excel or any other can be used.

<b>B. Sc. (Information Technology)</b>	<b>Semester – VI</b>	
<b>Course Name: Principles of Geographical Information System Practical</b>		<b>Course Code: USIT6P4 (Elective II)</b>
<b>Periods per week (1 Period is 50 minutes)</b>		<b>3</b>
<b>Credits</b>		<b>2</b>
	<b>Hours</b>	<b>Marks</b>
<b>Evaluation System</b>	<b>Practical Examination</b>	<b>2½</b>
	<b>Internal</b>	<b>--</b>
		<b>-</b>

<b>Practical No</b>	<b>Details</b>
<b>0</b>	Familiarizing Quantum GIS: Installation of QGIS, datasets for both Vector and Raster data, Maps.
<b>1</b>	Creating and Managing Vector Data: Adding vector layers, setting properties, formatting, calculating line lengths and statistics
<b>2</b>	Exploring and Managing Raster data: Adding raster layers, raster styling and analysis, raster mosaicking and clipping
<b>3</b>	Making a Map, Working with Attributes, Importing Spreadsheets or CSV files Using Plugins, Searching and Downloading OpenStreetMap Data

<b>4</b>	Working with attributes, terrain Data
<b>5</b>	Working with Projections and WMS Data
<b>6</b>	Georeferencing Topo Sheets and Scanned Maps Georeferencing Aerial Imagery Digitizing Map Data
<b>7</b>	Managing Data Tables and Spatial data Sets: Table joins, spatial joins, points in polygon analysis, performing spatial queries
<b>8</b>	Advanced GIS Operations 1: Nearest Neighbor Analysis, Sampling Raster Data using Points or Polygons, Interpolating Point Data
<b>9</b>	Advance GIS Operations 2: Batch Processing using Processing Framework Automating Complex Workflows using Processing Modeler Automating Map Creation with Print Composer Atlas
<b>10</b>	Validating Map data

<b>B. Sc. (Information Technology)</b>	<b>Semester – VI</b>		
<b>Course Name: Advanced Networking Practical</b>		<b>Course Code: USIT6P5 (Elective II)</b>	
<b>Periods per week (1 Period is 50 minutes)</b>		<b>3</b>	
<b>Credits</b>		<b>2</b>	
Evaluation System	<b>Practical Examination</b>	<b>Hours</b>	<b>Marks</b>
	<b>Internal</b>	<b>2½</b>	<b>50</b>
		<b>--</b>	<b>-</b>

<b>Practical No</b>	<b>Details</b>
<b>1</b>	<b>Configuring OSPF – I</b>
a	Single-Area OSPF Link Costs and Interface Priorities
b	Multi-Area OSPF with Stub Areas and Authentication
<b>2</b>	<b>Configuring OSPF – II</b>
a	OSPF Virtual Links and Area Summarization
b	OSPF over Frame Relay
<b>3</b>	<b>Redistribution and Administrative Distances</b>
a	Redistribution Between RIP and OSPF
b	Manipulating Administrative Distances

<b>4</b>	<b>BGP</b>
a	Configuring BGP with Default Routing
b	Using the AS_PATH Attribute
c	BGP Route Reflectors and Route Filters
<b>5</b>	<b>IPv6</b>
a	Configuring OSPF for IPv6
b	Configuring 6to4 Tunnels
<b>6</b>	<b>VLANs and EtherChannel</b>
a	Static VLANs, VLAN Trunking, and VTP Domains and Modes
b	Configuring EtherChannel
<b>7</b>	<b>Spanning Tree Protocol</b>
a	Spanning Tree Protocol (STP) Default Behavior
b	Modifying Default Spanning Tree Behavior
<b>8</b>	<b>VLAN and Spanning Tree</b>
a	Per-VLAN Spanning Tree Behavior
b	Multiple Spanning Tree
<b>9</b>	<b>Internal VLAN Routing</b>
a	Inter-VLAN Routing with an External Router
b	Inter-VLAN Routing with an Internal Route Processor
<b>10</b>	<b>Configure NAT Services</b>

<b>B. Sc. (Information Technology)</b>	<b>Semester – VI</b>	
<b>Course Name: Advanced Mobile Programming Practical</b>	<b>Course Code: USIT6P6</b>	
<b>Periods per week (1 Period is 50 minutes)</b>	<b>3</b>	
<b>Credits</b>	<b>2</b>	
	<b>Hours</b>	<b>Marks</b>
<b>Evaluation System</b>	<b>Practical Examination</b>	<b>2½</b>
	<b>Internal</b>	<b>--</b>

<b>Practical No</b>	<b>Details</b>
<b>1</b>	<b>Introduction to Android, Introduction to Android Studio IDE, Application Fundamentals:</b> Creating a Project, Android Components, Activities, Services, Content Providers, Broadcast Receivers, Interface overview, Creating Android Virtual device, USB debugging mode, Android Application Overview. Simple “Hello World” program.
<b>2</b>	<b>Programming Resources</b> Android Resources: (Color, Theme, String, Drawable, Dimension, Image),
<b>3</b>	<b>Programming Activities and fragments</b> Activity Life Cycle, Activity methods, Multiple Activities, Life Cycle of fragments and multiple fragments.
<b>4</b>	<b>Programs related to different Layouts</b>

	Coordinate, Linear, Relative, Table, Absolute, Frame, List View, Grid View.
<b>5</b>	<b>Programming UI elements</b> AppBar, Fragments, UI Components
<b>6</b>	<b>Programming menus, dialog, dialog fragments</b>
<b>7</b>	<b>Programs on Intents, Events, Listeners and Adapters</b> The Android Intent Class, Using Events and Event Listeners
<b>8</b>	<b>Programs on Services, notification and broadcast receivers</b>
<b>9</b>	<b>Database Programming with SQLite</b>
<b>10</b>	<b>Programming threads, handles and synchronized programs</b>
<b>11</b>	<b>Programming Media API and Telephone API</b>
<b>12</b>	<b>Programming Security and permissions</b>
<b>13</b>	<b>Programming Network Communications and Services (JSON)</b>

# APPENDIX - 1